

Eddie Gerba and Corrado Macchiarelli

Sovereign bond purchases and risk sharing: myth and reality of the European QE

Report

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POLICY DEPARTMENT A: ECONOMIC AND SCIENTIFIC POLICY

Sovereign Bond Purchases and Risk Sharing: Myth and Reality of the European QE

IN-DEPTH ANALYSIS

Abstract

In March, the Eurosystem started to purchase on the secondary market euro-denominated bonds issued by governments, agencies and European institutions. The total amount of bond purchases is estimated to 1.14 trillion EUR until September 2016, or 60 billion EUR per month.

The size of the Expanded Asset Purchase Program raises issues of scarcity of bonds to be purchased by the Eurosystem without inducing a fall of yields at record (negative) levels. Several sovereign bonds (Germany, France, Netherlands) already exhibit negative rates.

Against this background, this paper reviews the main features of government bond markets in the Euro-area, including its size, structure, and current developments. Moreover it discusses the (potential) financial risks that the Eurosystem might be taking on its balance sheet in view of the currently low (or negative) yields and (expected) shortage in supply of sovereign bonds.

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AUTHOR

Eddie GERBA, London School of Economics
Corrado MACCHIARELLI, London School of Economics

RESPONSIBLE ADMINISTRATOR

Dario PATERNOSTER
Policy Department A: Economic and Scientific Policy
European Parliament
B-1047 Brussels
E-mail: Poldep-Economy-Science@ep.europa.eu

LINGUISTIC VERSIONS

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ABOUT THE EDITOR

To contact the Policy Department or to subscribe to its monthly newsletter please write to:
Poldep-Economy-Science@ep.europa.eu

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EXECUTIVE SUMMARY

The expanded asset purchase programme (EAPP) announced in January is aimed at fulfilling the ECB's price stability mandate, in particular aimed at achieving an inflation rate below but close to 2%. The EAPP consists of monthly purchases of EUR 60 billion in public and private sector securities, purchases under the public sector purchase programme (PSPP) of marketable debt instruments issued by euro area central governments, certain public agencies located in the euro area or certain international or supranational institutions. Some restrictions have been applied on the size and composition of the bond purchases in order to mitigate potential risks from monopolizing the market. The purchases will run until September 2016, or until the level of inflation is consistent with the ECB target.

The currently low (or negative) yields for many segments of Eurosystem sovereign bonds coupled with possible shortages of available bonds to purchase poses challenges to the success of the programme. However, based on the current projections, the restrictions inherent in the program should not be binding, and therefore the scarcity in the supply of bonds should not be an issue. Nonetheless, as evolving economic conditions may drastically affect the bond market. We therefore identify a number of potential financial risks that need to be considered and monitored:

- At the start of QE there was essentially an effect on negative front-end yields (2 years). Subsequently, there has been a substantial flattening on the long end of the curve (maturity above 20 years). This is likely to force investors to look for riskier assets, via a significant portfolio rebalancing.
- At the same time, with Grexit concerns being on the rise, the price impact of QE in pushing periphery yields lower may increase going ahead. Importantly, this may not be the case for Greece, as markets may be willing to discriminate even more, especially if the ECB will be pushed into a situation where the 25% and 33% QE limits become biting.
- A fall in yields into negative territory for German Bunds of up to 4 years maturity, the self-imposed restrictions on the EAPP program, and the high appetite amongst institutional investors for holding bonds for regulatory and liquidity purposes puts a lot of uncertainty on the timing of a potential shortage of bonds.
- High market volatility during the second month of QE has forced financial intermediaries to hold more capital to offset this volatility (please see Draghi's recent remarks on the volatility issue – ECB press). Coupled with a generally low-yield on these bonds, this could result in losses for financial intermediaries. Possible consequences of this could be a reduction in overall (private) lending activities.
- Negative yields and high market volatility introduce noise into security prices, which makes the risk management by financial intermediaries much more problematic. In extreme cases, this can lead to an under-pricing of risks.
- There is already some evidence that negative yields may induce capital outflows from Europe to the US (and possibly to Asia and the Middle East). Moreover, the record-low yields are spreading to other fixed-income segments, such as corporate bonds, where already some the big firms issue bonds at negative yields.
- While the limited risk-sharing arrangements of QE purchases do not constitute a major risk to the ECB's balance sheet, a limited European guarantee and course of actions may make markets believe that "QE is not enough" as the decoupling of Greek bonds has recently shown. To be credible the EAPP needs more mutualisation.

- A materialization of any of these risks might potentially undermine the success of QE and its overarching objective of reviving inflation and, ultimately, economic activity in the Eurozone. Therefore a careful monitoring of market developments as well as flexibility in the implementation of policy measures are crucial elements for the success of QE. We identify a number of measures which could mitigate some of the risks in the last section.

DRAFT

1. INTRODUCTION

As announced by ECB President Mario Draghi at the press conference of 22 January 2015, in March the Euro-system started the Expanded Asset Purchase Programme (EAPP), i.e. the purchase (on the secondary market) of euro-denominated bonds issued by governments, agencies and European institutions. The program foresees a key role of national central banks (NCBs) of the Eurozone in the purchase of sovereign bonds. This will be part of the European Central Bank's 1.14 EUR trillion landmark quantitative easing (QE) programme (or about EUR 60 billion/month) to be carried out until September 2016. Given its size and open-ended nature, QE has been at the centre of policy discussions.

One issue is the capacity of the Eurosystem to find enough sovereign bonds to be purchased without inducing a fall of yields at record levels. Critics of ECB's QE programme are concerned about the material risks of a drying up of the euro area bond market and potential (future) costs/losses incurred by the Eurosystem. This note will review and discuss these aspects in details.

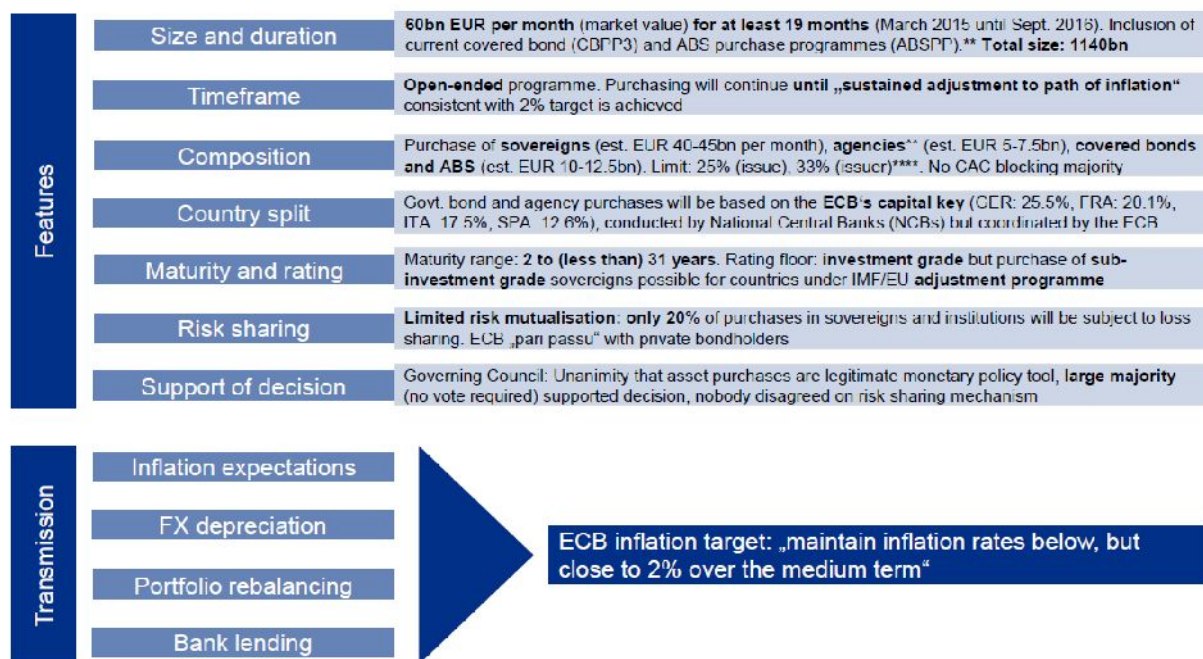
2. REVIEW OF THE EAPP

2.1. Details of the Programme

The Expanded Asset Purchase Programme (EAPP) announced in January is aimed at fulfilling the ECB's price stability mandate, i.e. at achieving an inflation rate below but close to 2% over the medium term.

The EAPP consists of monthly purchases of EUR 60 billion in public and private sector securities, purchases under the public sector purchase programme (PSPP) of marketable debt instruments issued by euro area central governments, by certain public agencies located in the euro area or certain international or supranational institutions. The purchases will run until September 2016, or until the ECB inflation target is met. An overview of the program and a summary of the key parameters are reported in Figure 1 and Table 1 respectively.

Figure 1: Key facts about ECB's Expanded Asset Purchase Programme (or QE)



Source: Allianz Global Investors Report

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Table 1: Calibration of the ECB Expanded Asset Purchase Programme

Timing: Purchases began in March 2015, intended to last until September 2016 and “in any case” until a sustained adjustment in the inflation path is achieved.

Volume: €60bn/month (total of all asset purchases). The additional purchases on top of the existing CBPP3 and ABSPP should be around €50bn/month.

Assets: Central government bonds, agencies and international or supranational institutions located in the euro area.

Country split: Purchases in government bonds and agencies to be divided according to ECB capital key.

Risk split: 80% of the additional purchases will be held by National Central Banks (NCBs) at their own risk, 20% of the purchases will be subject to loss-sharing, comprising the portfolio of European institutions (12% of additional purchases) and an ECB portfolio of government bonds and agencies (8% of additional purchases).

Volume limitations: 25% issue limit, 33% aggregate holding limit (issuer limit). Limits apply to total of additional purchases plus existing SMP portfolio.

Country limitations: Program countries will be excluded during their program reviews (e.g. Greece).

Maturities: 2-30 years.

Seniority: Eurosystem supposed to accept pari passu treatment.

Securities lending: Yes.

Inflation-linked debt, floaters: Eligible.

Reporting: Weekly reporting of the aggregate monetary policy portfolios detailed monthly reporting by issuer residence and weighted average maturity.

Source: Commerzbank's Rates & Credit Research

Such monthly purchases will be allocated to different asset classes. In particular, EUR 10 billion – the average value of the monthly purchases falling under the remit of the Asset-Backed Securities Purchase Program (ABSPP) and the Covered Bond Purchase Program (CBPP3) launched in October last year – will continue to be channelled through to purchases of covered bonds and asset-backed securities.

“Additional purchases” of EUR 50 billion – representing de facto the novelty of the EAPP – will be partitioned as follows. EUR 6 billion per month will go towards the purchase of the debt of supranational institutions located in the euro area; the remaining EUR 44 billion will be split among sovereigns and agencies.

Specifically, EUR 4 billion will be held by the ECB (8% of the €50 billion “additional purchases”), and EUR 40 billion will be held by the NCBs. As a part of this allowance, the NCBs will be able to choose themselves between purchases of sovereign bonds and the bonds of the agencies under their jurisdictions (ECB, 2015). A list of eligible agencies (as of May 2015) is provided in Table 2. The ECB has not specified what share should be spent specifically on agencies' bonds, albeit market analysts estimate this amount to be around EUR 3.6 billion.¹

¹ Bloomberg (Across the curve). Published on 26-02-2015.

Table 2: Eligible issuers (as of May 2015) of bonds

International & Supranational QE Eligible Issuers**International or supranational institutions located in the euro area**

Council of Europe Development Bank

EZ Atomic Energy Community

EZ Financial Stability Facility

EZ Stability Mechanism

EZ Investment Bank

EZ Union

Nordic Investment Bank

Agencies located in the euro area

Caisse d'amortissement de la dette sociale (CADES)

Union Nationale Interprofessionnelle pour l'Emploi dans l'Industrie et le Commerce (UNEDIC)

Instituto de Credito Oficial

Kreditanstalt fuer Wiederaufbau

Landeskreditbank Baden-Württemberg Foerderbank

Landwirtschaftliche Rentenbank

NRW.Bank

Source: ECB and Nikko Asset management

The ECB committed to buy government and corporate bonds in proportion to each country's 'capital key'. This is a measure of a country's size, calculated according to their population and gross domestic product (in nominal terms). Hence, the ECB will buy more bonds from bigger countries than smaller ones. We will come back to this point later.

As for the previous programs (Security Market Program (SMP), Outright Monetary Transactions (OMT)), there will be no primary market purchases under the EAPP, regardless of the type of security, as such purchases are not allowed under Art. 123 of the Treaty on the Functioning of the European Union (TFEU).

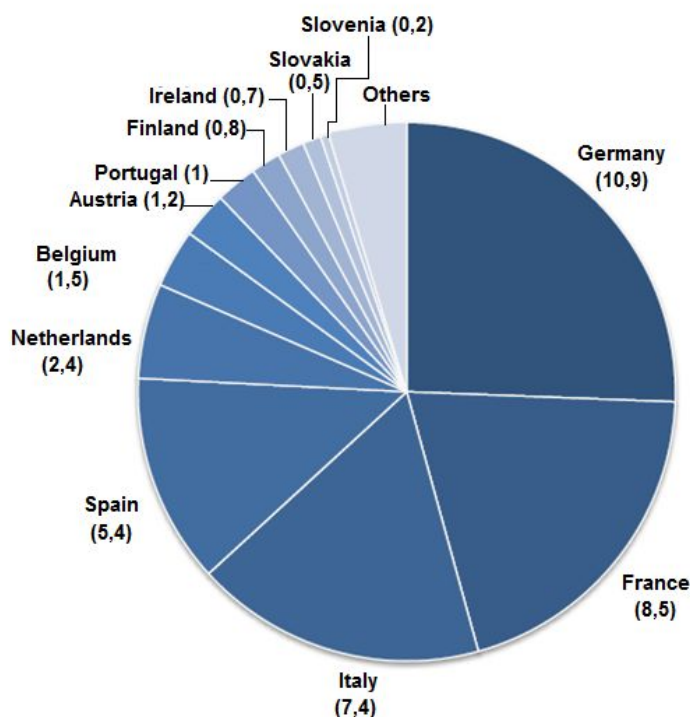
To be purchased in the secondary market, the bonds must have a remaining maturity of 2 to 30 years, be denominated in euros and eligible as collateral for ECB monetary policy operations (i.e. typically collateralized lending or repos). The ECB has set a ceiling on what it is willing to pay for bonds — debt on offer at yields of below its deposit rate of minus 0.2 per cent will not be bought.² Taking into account these criteria, the monthly purchases of each country's bonds that is expected to be bought under ECB's capital key rule are presented in Figure 2.

With regards to the sharing of hypothetical losses, the Governing Council decided that purchases of securities from European institutions – which will be, as discussed, 12% of the additional asset purchases, and they will be purchased by NCBs – will be subject to loss sharing. The rest of the NCBs' additional asset purchases will not be mutualized. The ECB will hold 8% of the additional asset purchases, effectively meaning that the ECB should shoulder 20% of the overall risks associated with QE. The remaining risk will be held by NCBs.

On top of the eligibility criteria reminded before, the Governing Council also decided to put in place a 25 percent issue limit and a 33 percent issuer limit on Eurosystem holdings. An issue share limit of 25% was applied in order to avoid a situation where the ECB would gain a blocking minority in the event of a debt restructuring concerning collective action clauses. This issue limit therefore also covers existing Eurosystem holdings of sovereign bonds in the context of the Securities Markets Programme (under which the 25% issue share limit was not applied at the time of previous purchases) and any other portfolios owned by Eurosystem central banks.

² Buying below the deposit rate would result otherwise into an accounting loss.

Figure 2: Monthly purchases volume based on ECB's capital key rule (in bn EUR) *



*Total monthly purchases held by NCBs is 40 billion Euros.

Source: Allianz Global Investors Report

Similarly, the issuer limit of 33% was meant to safeguard market functioning and price formation as well as to mitigate the risk of the ECB becoming a dominant creditor of euro area sovereigns. In this respect, the 33% limit is applied to all eligible assets in the 2 to 30-year range of residual maturity. The 33% issuer limit applies to the combined holdings of bonds under all purchase programmes.³

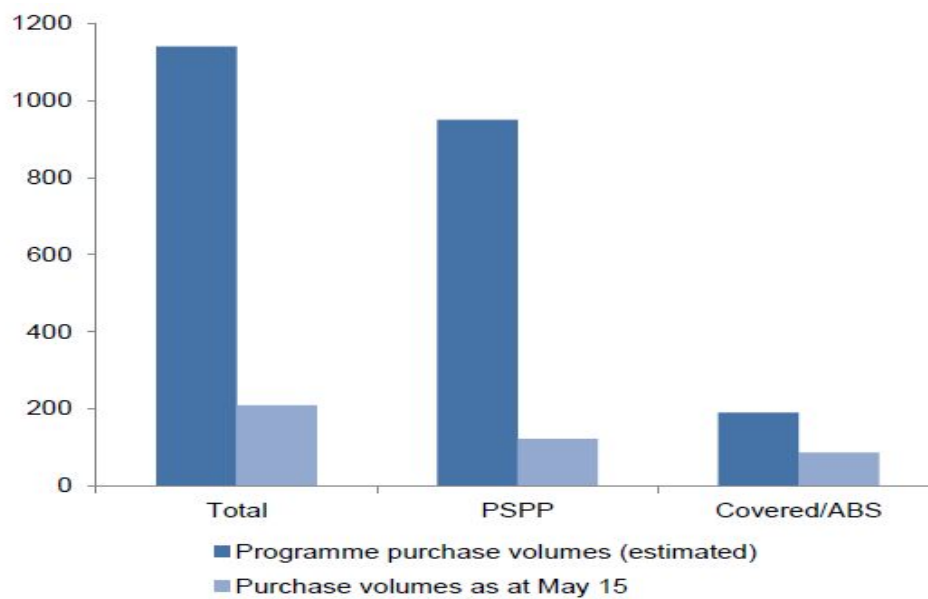
Except for Greek debt, the 25 per cent and 33 per cent caps should at the moment not prove binding in a scenario where the ECB keeps a pace of monthly asset purchases of €60bn. The limits could be reached in the event the ECB would need to increase the size of its monthly purchases under QE or implement OMTs targeted on specific (peripheral) countries.⁴ However, we recognize that many factors affect the liquidity in the bond market, as will be discussed in the subsequent section.

In terms of the amounts already purchased by ECB/NCBs as of May 15th, Figure 3 depicts the executed amounts versus the total estimated (until, at least September 2016). Looking at the shares between the national bonds (PSPP) and securities issued by agencies (Covered/ABS), the share of latter has clearly outpaced the former, and almost half of the estimated agency securities have already been purchased. Already now, this raises questions to whether the share of agency bonds will be expanded in the near future, or whether Eurosystem plans to stop purchases of those at some point. In any case, there is a high probability that the (estimated) 1-to-10 split between agency and sovereign bonds will be violated in the near future.

³ ECB (2015).

⁴ Claey's, Leandro and Mandra (2015)

Figure 3: Composition and purchase volumes of the EAPP (in bn EUR)

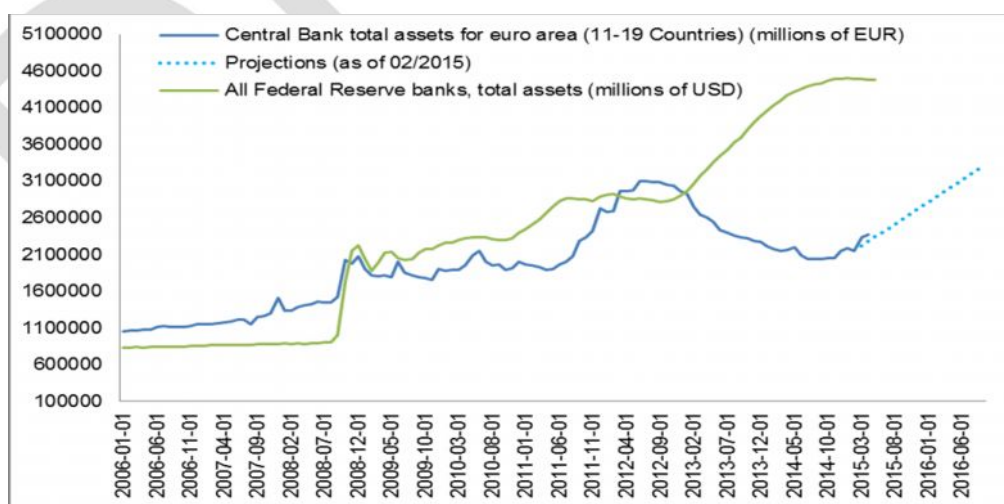


Source: Allianz Global Investors Report

2.2. The nature and early effects of the intervention

Quantitative easing will certainly increase the size of the ECB's balance sheet. Figure 4 shows the asset side of the balance sheet. Unlike the Fed's balance sheet, which continued to increase, the ECB's balance sheet has shrunk for almost two years. Since July 2012, the ECB's balance sheet has declined from a little less than 3.2 trillion euros to about 2.2 trillion euros. Many economists have found this decline puzzling, given that the ECB's balance sheet was contracting as Europe fell into a recession. For the ECB we calculated the projections according to an estimated monthly purchase of EUR 60 billion until September 2016 so to hit the targeted 1.14 trillion asset increase.

Figure 4: ECB and Fed Total Assets
(outstanding amounts, end of month)



Source: Federal Reserve Bank of St. Louis. Authors' calculations.

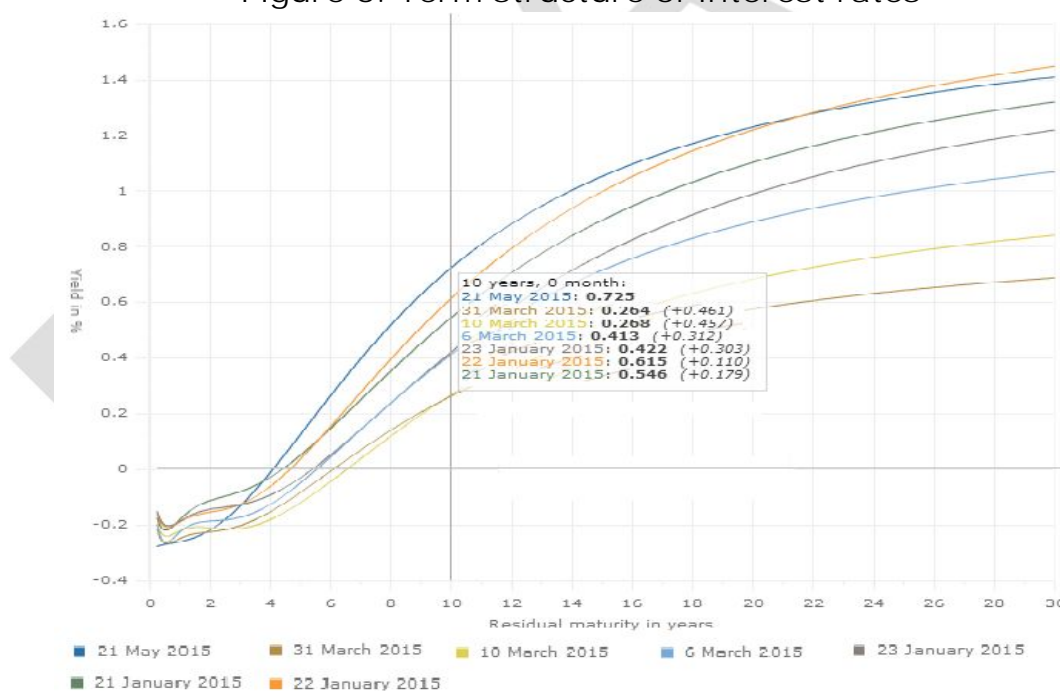
Whether this policy will succeed as intended is another issue. Economists continue to debate the effectiveness of the Fed's QE programs, and estimating the macroeconomic effects of such measures is clearly challenging.

Similar initiatives to the European QE have been recognized to generally have success in the United States and the United Kingdom. According to IMF (2013), in the US, the cumulative effects of bond purchase programs on bond yields are estimated to be between 90 and 200 bps (estimates vary depending on methodologies and event windows). Most studies focused on LSAP 1 (Large Scale Asset Purchase) where the largest effects are found (between 50 bps and 100 bps). In the U.K., cumulative effects range from 45 bps to 160 bps.

However, the US and UK environment in which such measures took place was a different one. Also, the technical details of the programs were different as they were targeting different types of assets. In Japan, for instance, IMF staff estimates highlight that purchases of government bonds under the Comprehensive Monetary Easing and Quantitative and Qualitative Monetary Easing Program's policies reduced 10-year yields by a little over 30 bps.

As discussed in a previous note,⁵ the effects of the ECB's quantitative easing are yet unclear. From what we can observe so far, the effect of the first round of purchases started on 9th March has flattened the entire yield curve, as well as shifted it down, compared to the curve before Draghi's announcement in January. Concerning the maturity distribution of sovereign bonds, it is important to note that most bonds – about three quarters of the 2-30 year range for the euro area as a whole – have a remaining maturity of less than 10 years.⁶ Therefore, most of the purchases will likely take place within this range as the ECB intends not to violate "market neutrality".⁷

Figure 5: Term structure of interest rates



Source: ECB website

⁵ "Financial (in)stability low interest rates and (un)conventional monetary policy", Monetary Policy Dialogue, note to the European Parliament, IP/A/ECON/2015-01, Mar 2015.

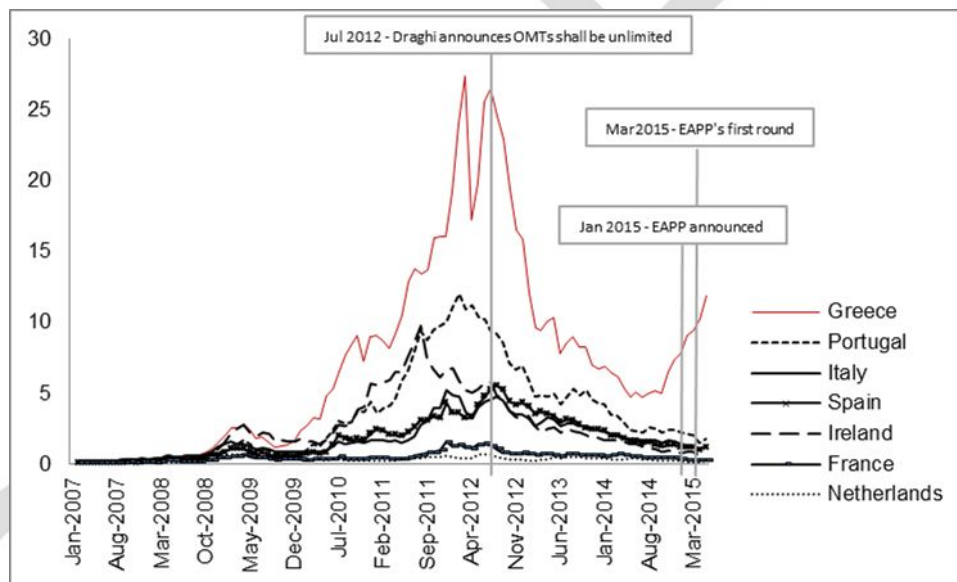
⁶ Claey's, Leandro and Mandra (2015)

⁷ ECB (2015)

In Figure 5, we highlight some key or end of month dates (note that 6th March is the last trading day before the QE announcement of 9th March). From the figure, it is clear that once QE started there was essentially an effect on negative front-end yields (2 years). In addition, there has been a complete flattening on the long end of the curve (maturity above 20 years) following the last recorded date. This is likely to force investors out of the curve into riskier assets, via a significant portfolio rebalancing. Moreover, this introduces noise in bond prices. Some comments are warranted in the next section.

At the same time, as per the effect of these first months of QE, government bond spreads between core and periphery narrowed down further, getting close to pre-2010 levels. The announcement effect and subsequent rounds of QE nonetheless did not prevent a decoupling of interest rates between Greece and other peripheral countries, under the heightened tensions of a possible Grexit (Figure 6). In particular, with Grexit concerns being on the rise, the price impact of QE in pushing periphery yields lower may increase going ahead. Importantly, this may not be the case for Greece, as markets may be willing to discriminate even more, especially if the ECB will be pushed into a situation where the 25% and 33% QE limits become biting.⁸

Figure 6: 10-year sovereign bond spreads
(vs. German bund)



Source: OECD Statistics and ECB's Statistical Data Warehouse. Authors' calculations.

In addition, while the yields of German Bund decreased in the first month of EAPP purchases, they started to rise again in the second half of April. Volatility of yields dramatically increased in the second months of EAPP, both inter-daily as well as intra-daily, prompting many market analysts to diagnose the problem as a lack of supply in the Bund market, which also constitutes the largest share of the QE purchases. We will develop on this point below.

⁸ In this respect, contrary to its initial design, the OMT programme could no longer be seen as "unlimited". In the case of Portugal, for instance, the 25 per cent and 33 per cent limits would leave barely any room for OMT purchases in addition to the planned QE purchases. The Portuguese case would be another interesting one as the limits imposed by the ECB on QE purchases interact with previous acquisitions of bonds by the ECB or the NCBs, limiting the pace of purchases as of 2017 already (see Claeys, Leandro and Mandra, 2015).

2.3. Current market reactions

Traders and market analysts have been very rapid in responding to the developments on the bond markets. In this section, we just wish to highlight a few of them in order to demonstrate the operational issues and challenges that are currently facing the QE program. We will discuss each one of them in further detail in the financial risks section below.

- "PSPP encourages market players to buy or hold on assets rather than selling them (e.g. asset liability management of insurance companies)", in relation to the limited (or low expected) supply of bonds, Ann-Katrin Petersen, Global Capital Markets & Thematic Research at Allianz, May 21, 2015
- "It will be challenging for the ECB to source enough government bonds to meet its QE targets", Anthony O'Brien, co-head of European rates strategy at Morgan Stanley, Feb 25, 2015
- "(European) passive investors and banks are unlikely to sell Bunds in large sizes due to investment mandates and regulatory reasons", Cagdas Aksu, rates strategist at Barclays, Feb 25, 2015
- "There is definitely a scarcity of safe assets, but a price will be found" in relation to the supply and price/yields of German Bunds, Luke Bartholomew, investment manager at Aberdeen Asset Management overseeing 323 bn GBP in funds, Feb 25, 2015
- "Even if the pace of decline in bond yields slows in the remainder of the year, the ECB could run out of eligible bonds from some governments by the turn of the year", Marie Diron, Senior Vice President at Moody's, Apr 14, 2015
- "The reason why you are getting these wild fluctuations is due to liquidity – or rather the lack of it", referring to the high volatility in Bund yields in late April, Steven Major, HSBC's Head of Fixed Income Research, Apr 30, 2015
- "We were positioned to see yields move higher, so it's been a favourable market move for us. But the speed of the move took everyone by surprise", in relation to the high market volatility in May, Andrew Wilson, Chief Executive Officer at Goldman Sachs Asset Management who handles more than 1 trillion USD, May 7, 2015
- "Right now the market is in a state of shock. A lot of people are staying clear, and that makes the market less liquid, which is helping to exaggerate market moves", Zoeb Saches, Head of European Government-Bond Trading at Citigroup Inc, May 7, 2015
- "It's as though QE disappeared – it didn't exist. In one week we had a total unwinding of all QE-related trades" in relation to the downward and then equal upward move in yields of German (and some other EZ) bonds, Franck Diximer, Chief Investment Officer for European Fixed Income at Allianz Global Investors, May 7, 2015
- "It's a combination of drivers but the lack of liquidity is exacerbating everything else that's going on. In the cash market for Bunds, our traders tell us that it is harder to get things done", in relation to the scarcity of Bunds, Lyn Graham-Taylor, Rabobank, May 7, 2015
- "(European investors) believe the short-to-medium trend will be dollar appreciation, so it makes sense for them to look elsewhere, especially the emerging markets", in relation to the observations that more investments are flowing out of EZ and into the Middle East, Angelo Rossetto, Trader at GMSA Investments, March 25, 2015
- "The repo market is still reflecting the growing mismatch between low supply and high demand for high-quality collateral, such as German Bunds...repo rates have recently

become even more negative. Even if the ECB has introduced securities lending to mitigate this effect, these potential shortages might dampen further yield increases on the market for euro area government bonds”, Ann-Katrin Petersen, Global Capital Markets & Thematic Research at Allianz, May 21, 2015

3. FINANCIAL RISKS RELATED TO EAPP

Following from the data available so far on the purchase programme, and from the comments of (market) participants and (market) makers on the trends in the sovereign bond market, we wish to highlight the potential (and realized) risks from EAPP. In particular, we do not only include risks that materialize directly onto central banks balance sheets, but also those of the European financial institutions and capital markets, as they are at the core of a well-functioning monetary and financial system.⁹ Moreover, in light of the newly proposed (and partially implemented) banking and capital market unions, the risks of QE generated on markets will play an even bigger role in the near future.

To structure our exposition, we have divided the analysis in two parts. First we consider the risks that low yields and shortage of bonds can cause in the immediate (or very near) future, the so-called ‘static effects’. Next, we consider the effects that persistently low (or negative) yields and shortage of bonds can have on the market behaviour and central bank balance sheets in the near future. We call this second type ‘dynamic effects’ since these risks would only materialize if these (market) characteristics remain for many periods. Finally we consider risk-sharing issues arising from the EAPP set-up.

3.1. Static effects of QE

3.1.1. Scarcity of bonds and liquidity risk

To look at the issue of scarcity, we must refer to the net issuance of European bonds after the start of QE.

Table 3: Monthly gross issuance minus redemptions and expected QE, vs. historical April March (EUR billion)

	Mar-15	Apr-15	May-15	Jun-15	Jul-15	Aug-15	Sep-15	Oct-15	Nov-15	Dec-15	Average
Germany	-15	-13	0	-15	-15	-1	-9	-15	1	-18	-10
France	12	-10	11	11	-26	-9	12	-21	-9	-2	-3
Italy	8	4	15	-18	-4	-16	2	20	-5	-40	-3
Spain	-4	-15	10	10	-10	-5	9	4	-10	-1	-1
Netherlands	7	-12	3	3	-10	-2	3	2	2	-2	-1
Belgium	-10	1	2	2	1	0	-10	1	1	-2	-1
Austria	0	0	1	2	-12	0	2	0	0	-1	-1
Finland	2	-1	0	0	-4	0	1	0	0	-1	0
Ireland	0	-1	0	0	1	0	1	-1	-1	-1	0
Greece	0	0	0	0	-4	-3	0	0	0	0	-1
Portugal	-1	5	-3	-3	2	1	2	-6	0	-1	0
Total	0	-41	39	-8	-82	-36	12	-15	-21	-67	-22

Source: ECB, NCBs and JP Morgan from marketwatch.com¹⁰

Between April and May net issuance of Eurozone government debt and other bonds that qualify for ECB purchases jumped from negative EUR 41 billion to positive EUR 39 billion. According to market analysts, this was largely due to the “typical lack of redemptions”, i.e.

⁹ And therefore can be transmitted to the CB balance sheet in an indirect manner, or at a later stage.

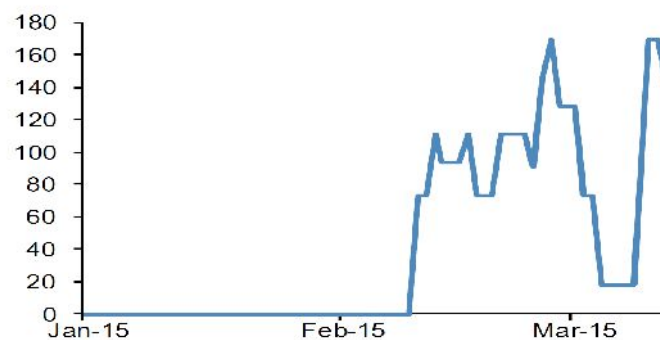
¹⁰ <http://www.marketwatch.com/story/there-may-be-a-simple-overlooked-reason-for-the-eu-bond-meltdown-2015-05-21>.

only a few bonds maturing this May (www.marketwatch.com), but also, as evidenced from Table 3 a zero net issuance of German Bunds.

With the ECB set out to buy EUR 60 billion a month, investors expect net issuance in the eurozone to remain negative. This is also evidenced from the last column of Table 3, where net issuance until January 2016 (excluded) is expected to be -22 EUR billion. According to these figures, the impact of bond supply is mainly concerned with German Bunds (but also with French and Italian to a certain extent).

JP Morgan (2015) highlighted a big increase in the number of euro government bonds between 2y and 30y traded below -20 basis points (i.e. the ECB's limit). In Figure 7 these numbers increased to 170 billion at the beginning of March, after the first QE round, mainly driven by German Bunds. According to JP Morgan (2015), this means that almost 4% of the EUR 4.6 trillion of 2y-30y euro government bonds and more than 20% of the EUR 800 billion of the whole 2y-30y German government bonds were traded below -20 basis points.

Figure 7: Euro area government bonds with maturity more than 2yr and yield < -0.2%



Source: JP Morgan (2015)

As Allianz (2015) points out, the ultra-loose monetary policy seems to be imposing the negative interest rate spectrum on high-quality credit rated bonds as the norm. As of May 21, 2015, one tenth of the EAPP eligible bonds have negative yields. The picture is even more drastic within the different maturities for the different sovereign bonds. According to Allianz Research, German Bunds under 4 years, and bonds of other northern European countries under 3 years were all traded at negative yields in May (Table 4). For Switzerland, the picture is even gloomier, where all bonds under 10 years are traded at negative yields.¹¹

Table 4: European generic bond yields (in %)

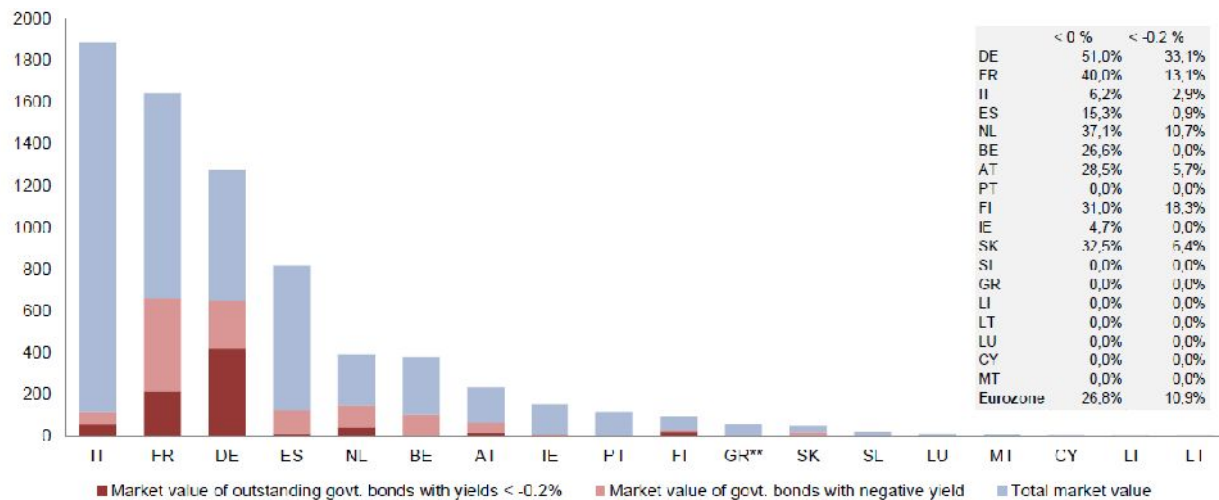
	3M	1Y	2Y	3Y	4Y	5Y	6Y	7Y	8Y	9Y	10Y	15Y	20Y	30Y
Germany	-0,32	-0,22	-0,22	-0,17	-0,05	0,07	0,14	0,26	0,41	0,52	0,64	0,90	1,10	1,28
France	-0,19	-0,18	-0,16	-0,05	0,08	0,23	0,32	0,48	0,64	0,79	0,92	1,29	1,46	1,72
Netherlands	-0,24	-0,18	-0,19	-0,08	0,01	0,13	0,32	0,46	0,61	0,70	0,82	1,29	1,46	1,72
Belgium	-0,19	-0,18	-0,15	-0,04	0,11	0,21	0,36	0,52	0,66	0,80	0,93	1,13	1,44	1,69
Austria		-0,18	-0,13	0,00	0,11	0,20	0,35	0,52	0,65	0,78	0,96	1,13	1,44	1,69
Finland		-0,23	-0,20	-0,04	0,06	0,15	0,20	0,28	0,50	0,58	0,69	1,03	1,28	1,58
Switzerland		-0,80	-0,79	-0,76	-0,58	-0,42	-0,30	-0,19	-0,13	-0,04	0,04	0,31	0,42	0,58
Sweden		-0,27	-0,37	-0,27	-0,15	-0,04	0,27	0,53			0,82			
Denmark		0,93	0,35	0,31		0,05	0,36				0,84			1,35

Source: Allianz Global Investors Report

In terms of volume (bn EUR), the amount of outstanding public debt (as of May 19, 2015) with negative yields below ECB's deposit rate at -0.2% per country of issuance is presented in Figure 8.

¹¹ Allianz Global Investors QE Monitor, Ann-Katrin Petersen, May 21, 2015

Figure 8: Total market volume of outstanding public debt at negative yields and yields below ECB's deposit rate (in bn EUR)



Source: Allianz Global Investors Report

Looking at these figures and taking into account ECB's rule that only bonds with a yield higher than its own deposit rate are eligible for QE, this considerably shrinks the universe of debt it can buy.

Moreover, there are pressures from regulators of financial intermediaries not to sell high-quality bonds, and even to increase their demand. On the pension fund side, regulators require them to allocate the majority of their capital to safe, low-risk asset classes and AAA-rated sovereign debt. Further, the desire to conservatively hedge their portfolios ensures that the demand (supply) for high-quality bonds from pension funds is high (low). Insurance companies are equally (if not more) required to be conservative, and they use bonds to match the duration of their liabilities. For instance, life insurance companies match the life expectancies of their policy holders by buying long-term bonds. Lastly, for banks there is an intrinsic incentive to hold sovereign debt because of the capital requirement calculations. Sovereign debt requires the least amount of regulatory capital, which allows the banks to achieve maximum leverage. Therefore, low-yielding sovereign bonds with a minimal capital requirement are sometimes more attractive, on balance, than high-yielding assets since they tie-up much more of a bank's scarce capital.¹² As Table 5 shows, the share of total bond-holdings that intermediaries are prepared to sell to ECB and NCBs is scarcely low.

Therefore, these regulatory constraints do not only cut the incentive for intermediaries to sell their bonds and increase the general supply, but push them to demand bonds even more. However, ECB's action will likely crowd their demand out which might lead to significant demand/supply distortions and possibly failures of regulatory compliance.

Lastly, the self-imposed restrictions on the ownership structure of bonds and portfolio composition reduce the flexibility of the ECB to implement its measures under the low yield-scenario. This can aggravate the scarcity problem even further. At the beginning of the QE (March 12, 2015), BNP Paribas (2015) made a 'stress test' on the supply of bonds based on the available market data at the time. It shows that despite an increasing scarcity of German Bunds, QE ownership of bonds could still remain below the 25% limit per issue rule, if the central bank purchases more of the longer-dated bonds to maintain QE effective. In order for scarcity to turn into a shortage-of-bond problem, yields would need to fall by a

¹² Integrated Mortgage Planners at integratedmortgageplanners.com, March 2, 2015

further 10-15 bp (compared to the March 12 yield), as ECB's implied ownership would be 25.8% and 27.4% respectively, clearly violating the 25% restriction.¹³

Table 5: Holders of Eurozone bonds and their willingness to sell

All Euro area	€bn					%				
	Domestic	Non-domestic			Total	Domestic	Non-domestic			Total
		Euro	Non-euro	Total			Euro	Non-euro	Total	
Central banks	270	236	1500	1736	2006	4%	3%	20%	23%	27%
Banks	1216	427	300	727	1943	16%	6%	4%	10%	26%
Insurance companies	802	300	120	150	952	11%	4%	2%	2%	13%
Pension funds	242	125	100	80	322	3%	2%	1%	1%	4%
Investment funds	380	432	50	482	862	5%	6%	1%	6%	12%
Others	620	218	90	308	928	8%	3%	1%	4%	12%
Total	3530	1738	2160	3898	7429	48%	23%	29%	52%	100%

* Domestic means investor is based in the country of the issuer

unwilling sellers (49%)

willing sellers (51%)

Source: Allianz Global Investors Report

3.1.2. Volatility, regulatory capital and capital losses

Following a general drop in yields of all bond maturities during the first month of QE, there was a sharp reversal in the second half of April. For instance, while the 10-year Bund traded at the record-low 0.077% on April 20, it rose to a short-term record high of 0.796% on May 7.¹⁴ This is more than a 10-fold increase in just over 2 weeks. Moreover, there has been high intra-day volatility since late April, which has made the markets nervous. As an example, Figure 9 shows the intraday yields traded on the 10-year German Bund on May 7. In a matter of 4 hours, the yield dropped 25 bp. The end-of-day yield was lower than the beginning-of-day yield, but the spike and then sharp drop experienced in a matter of a few hours is not the normal intra-day volatility.

Since Bund yields act as a ('risk-free') benchmark for other rates, an increased volatility in these affects other prices across European financial markets. That has already led to spill-over on the futures markets (futures are used as a hedge), where the volume of trading on 10-year German Bunds was more than the double the average for the past 5 years in the first week of May. Also intra-day volatility of other bonds sharply increased. Yields on French 10-year bond hit 1.10% before falling back to 0.90% later the same day (May 7). Equivalent Italian bond yield moved almost 30 bp., from 2.03% to 1.76%, on the same day.¹⁵ Market analysts are unclear on what triggered these moves, but many point towards a lack of a European policy commitment in an environment where inflation expectations are starting to rise, a lack of liquidity, or ECB's determination to see the euro weaken, as key drivers.¹⁶

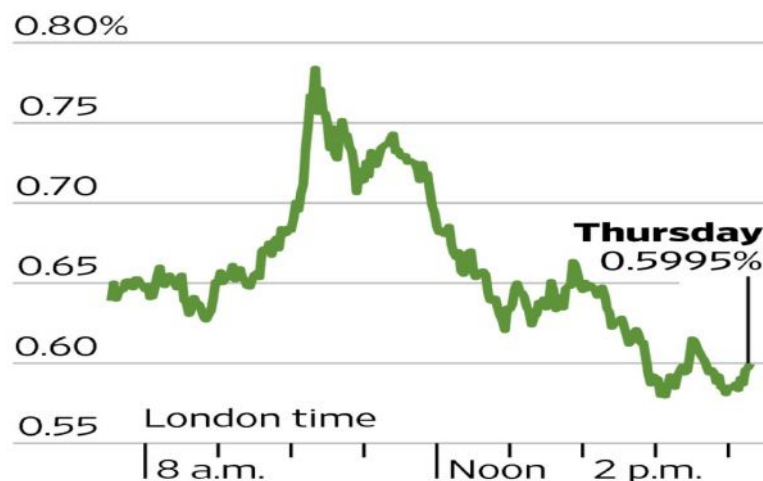
¹³ ECB QE: The thin line between scarcity & shortage, BNP Paribas, March 12, 2015

¹⁴ WBP Online: Bye-Bye QE Effect: German Bund Yields Spike Amid Epic Bond Rout, May 7, 2015

¹⁵ Wall Street Journal: European Bonds Back to Pre-QE Levels after Weeklong Selloff, May 7, 2015

¹⁶ Analyzing the underlying causes is beyond the scope of this work, and more data will be needed to generate such studies. However, we do wish to point out the confusion that exists amongst market participants and market watchers, which could make the problems more serious in the coming months.

Figure 9: Yield on 10-year German Bund on May 7, 2015



Source: Tradeweb, The Wall Street Journal.

These moves can have sizeable effects on the balance sheet of banks, insurers and pension funds that, as we mentioned before, are holding a lot of these bonds for regulatory and liquidity purposes. Thus, an increase in volatility of the seemingly risk-free sovereigns might push up the volatility of the entire balance sheets, which would force them to hold even more capital to offset the perceived rise in volatility. Coupled with a generally low-yield on these bonds, this could result in losses for the financial intermediaries. Under the current market (and economic) environment, that would not be welcoming since this may cause them to reduce overall lending, either by charging a higher risk premium for credit, reduce lending volume, or both.¹⁷

3.1.3. Volatility, price noise, and risk management

Sharp price moves can also introduce noise into prices. This is in particular true for sovereign bonds, which are used as market benchmarks and which traditionally have been considered as a risk-free market alternative. However, with negative yields and sharp price swings, it becomes unclear whether the bonds remain risk-free under current market circumstances, or whether their risk profile has changed. For a financial intermediary's risk management strategy it is crucial to know the price and risk profile of bonds, as their portfolio strategies will be measured against it. In normal circumstances, these bonds will be considered risk-free and therefore the risk-return profile of the intermediary's portfolios can easily be determined and subsequent hedging positions taken. However, if the prices of bonds carry noise and do not represent the 'true' risk profile of these instruments, the task of risk managers becomes problematic, as (market) benchmarking becomes difficult to obtain. In extreme cases, such noise can lead to severe under-pricing of risk and security mispricing, as in the US subprime market between 2006 and 2007.

3.1.4. Capital outflows

With a rising USD and a foreseeable rise in the Federal Funds rate in the near future, there is a significant risk that capital will flow out of the European markets, and into the US government and corporate debt. Yields on the European markets are extremely low (if not negative), and are expected to remain at these levels until at least September 2016. Investors, seeking higher returns, might take their capital out of Europe. This, in turn puts additional pressure on the EUR and pushes the USD up. Hence investment flows to the US could be enhanced by currency return. This trend seems very likely in the current context

¹⁷ Moreover, in normal circumstances, banks wish to hold as little capital as possible. Therefore, by having to hold more capital, they will also become less liquid in their operations, which is not desirable from a financial point of view.

since as early as mid-April, some European corporate bonds traded at negative yields, including bonds from BP, Novartis, Royal Dutch Shell and Nestlé. And this was only after a month of QE.¹⁸ Generali Investments Europe reported in February 2015 (i.e. before QE launch) that more than half of euro-area government bonds are held by institutions who have direct access to extra-European markets, and can therefore easily redirect their investments at a low cost.¹⁹ Thus, continued pressure on the euro currency would not be surprising as investors sell their European bonds, and then exchange them for more attractive investments in the US, or elsewhere. As recent as last month, Abu Dhabi and other regional corporations issued debt as a means of funding their expansion programmes. Prospects of higher yields in the Emirates are by many experts expected to generate particular interest amongst European investors keen to obtain dollar-denominated bonds (since dirham is pegged to USD). In early February, National Bank of Abu Dhabi placed 750 million USD in bonds, with a coupon of 2.25% maturing in 2020 (compare that to below 0.1% in the Eurozone for a bond maturing in 5 years as of May 21). Almost half of the sale went to European investors. In addition, a report issued in March by Barclays Capital expects Abu Dhabi and other Gulf States to increase their bond issuance in the near future, since the flow of bank deposits have weakened partly due to the lower oil prices.²⁰ Under these (favourable) international market conditions, a capital outflow from Europe seems a very likely option for European investors.²¹ Therefore Middle East (ME), and possibly Asia could be the new net receiver of European investments.²²

3.2. Dynamic effects of QE

3.2.1. Spill-over effects to other (financial) market segments

The ECB's bond-purchase program appears to affect the European fixed-income market to a greater degree than the Fed's QE programs influenced US interest rates. Taking into account that the size of ECB's QE program is very similar to the US counterpart, and that the European fixed-income market is smaller and (potentially) less liquid than the US market, it is to be expected that the impact on rates in the European case is greater than what was witnessed with the Fed. The spill-over effects on European corporate yields are already evident (as shown in the previous section), and ultimately it is expected to have effects on fixed-income markets in the US.²³ Moreover, tensions are building up on the repo markets – in which government bonds are used as collateral to borrow cash. So far, attempts by the ECB to alleviate repo stress (by lending back bonds) have not worked and market participants complain that securities lending programmes are too costly and too heterogeneous between Eurozone countries.²⁴

The effects on other (non-Eurozone) European markets are also evident. Ahead of ECB's decision to launch the EAPP program, the Swiss National bank abandoned its exchange rate floor. As a result, the value of Swiss franc surged sharply as a result, and combined with the adoption of more deeply negative deposit rates, Swiss sovereign bond yields moved to

¹⁸ Lord Abbett: ECB, get ready for shockwaves from QE, April 17, 2015.

¹⁹ More than 30% are owned by foreigners, and more than 20% by pension funds and insurance companies. GIE Research Market Commentary, February 2015.

²⁰ Spy Ghana: Abu Dhabi's bond market sets to grow with influx of QE funds, April 23, 2015.

²¹ Recent studies by Chen et al (2012) and Fratzscher et al (2013) have shown that US QE lead to significant (pro-cyclical) outflow of capital from the US to emerging markets. Taking into account the context in which LTAPs 1 and 2 in the US were executed and the current market environment, it is more than likely that these results would be strengthened in the European case.

²² In the light of QE, data on net outflows of capital from Eurozone to Asia are not readily available; therefore we only concentrate on ME in this exposition.

²³ Via higher interest rates and an increase in capital inflow. Lord Abbett: ECB, get ready for shockwaves from QE, April 17, 2015.

²⁴ Financial Times: German bonds measure success of Eurozone QE, April 30, 2015.

negative territory across all maturity spectrum up to 10 years. The Danish central bank pushed interest rates further into negative territory (from -0.05% to -0.75%) in order to maintain its long-standing currency peg to the EUR.²⁵ In addition, central bank sharply increased its pace of foreign exchange reserve accumulation as buffer. Also Sweden cut its policy rates into negative territory and further initiated QE purchases to balance the ECB's. Poland, Romania and Turkey all cut rates.²⁶

A sustained period of such international (active) re-balancing can have sizeable negative effects for market functioning. Low or negative yields in the fixed-income segment can, if sustained under a longer period of time, push liquidity out of that entire segment and turn it into a 'ghost' market. Where the liquidity will go is difficult to say at this point, but there is a noticeable probability that it will go to riskier or (speculative-prone) segments, such as derivatives market. Taking into account the events that unfolded following excessive speculation on those market running up to September 2008, it is worth monitoring these developments with much care.

3.2.2. Weakened macroeconomic effects from QE

The observation on May 7 by Wall Street Journal²⁷ that the reversal in yields in the second month of QE was so sharp that the yields returned to the levels before the stimulus began can, if repeated, have a weakening effect on the macroeconomic transmission of QE. Typically, higher (lower) inflation expectations and higher (lower) economic growth push up (down) yields. However, multiple reversals of this type can cause turbulence as it would heighten fears of a disruptive sell-off.²⁸ Down the line, this would result in weak (if not negative) transmission to the macroeconomy that could possibly undermine ECB's objective of 2% inflation and macroeconomic revival across the Eurozone. At the moment, this scenario does not seem likely, but if repeated reversals of this type re-emerge, then the effectiveness of the policy could seriously be questioned. Therefore it is crucial to keep an eye on market developments also from this angle.

3.3. Risk-sharing issues

The extent to which QE-related profits are channelled back through the Eurosystem is well summarized by Bruegel's report of Claey's, Leandro and Mandra (2015) (see Figure 10).²⁹ According to the EAPP, the ECB is able to buy a portfolio of government bonds in proportion to the economic weight of each country in the euro zone (the capital keys), i.e. 26% of German bonds, 20% of French bonds, 17% of Italian bonds, etc. (see also Table 2).³⁰ The profits made on the sovereign debt held by the ECB are redistributed to countries according to the capital keys. This very much corresponds to a rule of *juste retour* (De Grauwe, 2015) whereby the ECB reimburses the same amounts to each euro area government, without any fiscal transfers between Member States. A similar reasoning applies to purchases of supranational bonds (Figure 10).

The remaining purchases by NCBs (totalling EUR 40 billion, as discussed) will focus entirely on the home market.³¹ Thus, each national central bank will be buying its own government bonds, exposing NCBs exclusively to its own country's debt holding.

²⁵ The Peninsula Qatar: ECB's QE can have large cross-border spillover effects, Feb 01, 2015.

²⁶ Looms Sayles: Bond Market Review and Outlook, April, 2015.

²⁷ Wall Street Journal: European Bonds Back to Pre-QE Levels after Weeklong Selloff, May 7, 2015

²⁸ Financial Times: German bonds measure success of Eurozone QE, April 30, 2015.

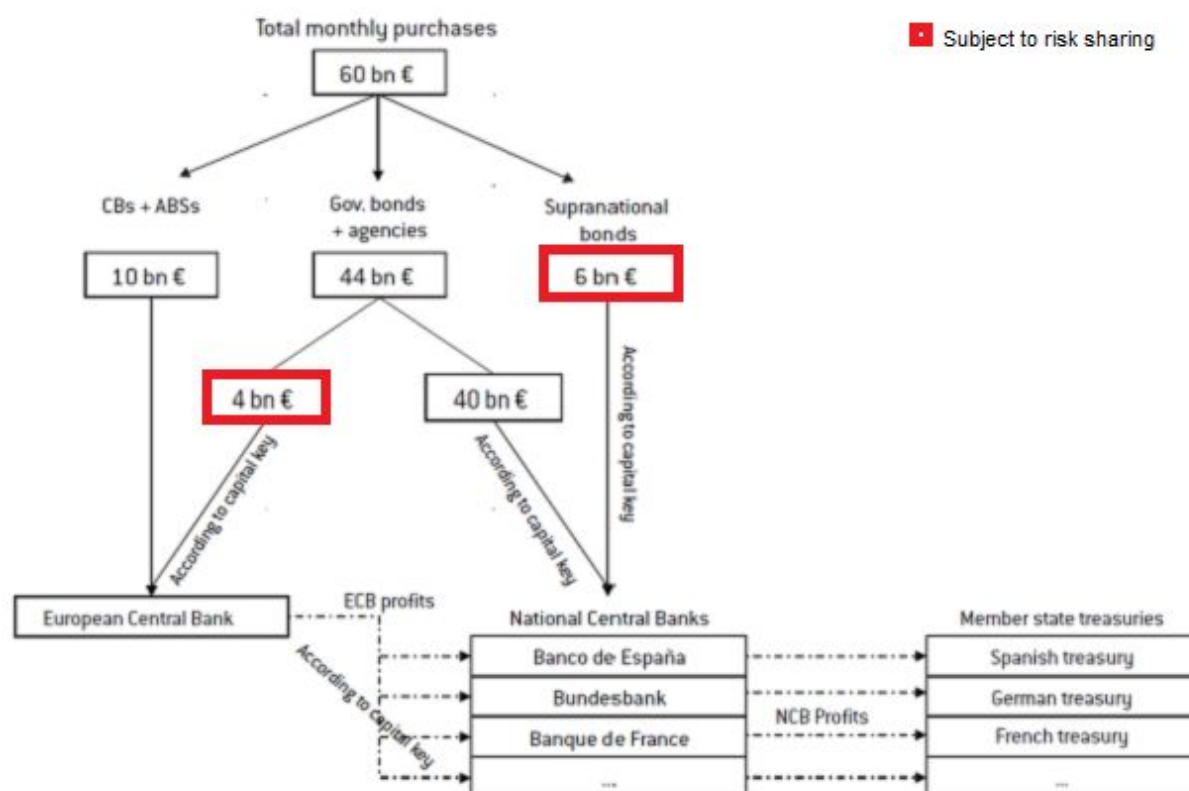
²⁹ The proportion of QE expenditure on euro area agencies' bonds are not explicitly accounted in the figure, but this is irrelevant for our discussion.

³⁰ The figures we propose are calculated as share of the capital key % over the total.

Source: <http://www.ecb.europa.eu/ecb/orga/capital/html/index.en.html>

³¹ ECB (2015)

Figure 10: Allocation of monthly asset purchases by the Eurosystem



Source: Claey's, Leandro and Mandra (2015)

Given the absence of risk sharing for these NCBs holdings, it is reasonable to assume that the potential profits will not be shared between NCBs.³² Therefore, for example, a large slice of forgone profits for the French central bank will be accrued to the French Treasury, not involving any fiscal transfers among euro area member states. Given the absence of risk sharing on such NCBs purchases, the same reasoning applies to potential losses as well³³

3.3.1 Risk sharing

One source of concern would involve the 20% joint liability resulting from ECB's (EUR 4 billion) and NCBs' purchases (EUR 6 billion) highlighted in Figure 10.

Should a government pursue a debt restructuring or a default, the ECB would have to book a loss on its balance sheet. Application of the just retour would imply the country not to receive any interests refund pro-rata, based on its capital key.³⁴ However, there is still a lot of uncertainty on this element and the rules on a eurozone central bank's involvement in a debt restructuring are rather unclear at the moment.

Certainly, this discussion should clarify whether a country's nonattendance will result into leaving the currency union or not.

Shall the ECB write-down the bond due to debt restructuring, this would result in an accounting "loss" that is not different from the losses due to the ECB's lending operations

³² Claey's, Leandro and Mandra (2015)

³³ For these purchases, the ECB stands as "lender of last resort" but this is irrespectively of the nature of the QE program.

³⁴ De Grauwe, 2015

(e.g. LTROs) or other public asset purchase programs (e.g., the Security Market Program). In fact, any such operations involve ECB's holding of government bonds or other assets.

In case a member state defaults and leaves the Eurozone instead, the ECB would still have to book a loss on its balance sheet (a write-off, from an accounting point of view), but at this point it would have little to do with how well designed the quantitative easing program is.³⁵ In fact, in case of a country leaving the eurozone, losses would extend to assets not only involved with QE purchases but also standard monetary policy operations, which would be a different issue.

3.3.2 Does the central bank need equity?

With regard to our previous example, when the central bank writes down the bonds of a country, the value of its assets will decline. The counterpart on the liabilities side of the central bank's balance sheet will clearly be recorded as a decline in equity. The empirical evidence would suggest that ECB's losses could be dealt without too many troubles for either the ECB's shareholders (sovereigns) or tax payers, as long as the ECB was willing to accept its capital moving into "negative territory".³⁶

An early ECB paper, Bindseil, Manzanares and Weller (2004), finds that a positive capital would safeguard the central bank's independence in ensuring price stability. Such a required level of positive capital will depend on the "risks in the central bank's balance sheet and on its contingent liabilities" (i.e. potential off-balance sheet obligations).

It is worth stressing again, however, that risk sharing on QE purchases would not constitute a risk to the ECB's balance sheet, which is qualitatively different to the one involved in standard monetary policy operations or previously implemented asset purchase programs (e. g, SMP, CBPP).

A central bank in fact needs not to have capital or positive net worth to function for small accounting losses on its balance sheet.³⁷ Alternatively, large enough losses in the central bank's balance sheet could be absorbed "if a fully automated and fully credible rule of re-capitalisation is in place".³⁸ This would be the case without the central bank having to abandon the price stability objective or having to resort to financial repression. The provisions contained in the Protocol on the Statute of the European System of Central Banks and of the European Central Bank (Art 33.2) suggest that all such rules are in place. Due to political frictions, what is lacking is a credible commitment. If, on the one hand, the decision to put limits to risk sharing would certainly affect the credibility of the QE program,³⁹ on the other hand, the possibility that risk sharing on, e.g., ECB's purchases, may constitute a risk to the ECB's balance sheet are very limited (Table 6), given the current arrangements. In other words, while limiting the ECB's purchases to 8% of the "additional purchases" (Figure 10) sends the message to the market that the degree of European involvement, in a federal sense, is limited, such ECB's purchases constitute a small risk for the ECB's balance sheet. In the Table below, we quantify "how small" these risks are and report the outcome of the Bruegel's projection exercise on sovereign bond purchases by countries and bondholders until September 2016.⁴⁰ We refrain from reporting the details of the projection exercise, which are well explained in Claey's, Leandro and Mandra (2015). In a very naïve fashion, we augment these results with a column looking at the ECB's balance sheet (i.e. total assets)

³⁵ See also Noonan (2015)

³⁶ See also De Grauwe (2015)

³⁷ Stella (1997)

³⁸ Bindseil, Manzanares and Weller (2004)

³⁹ De Grauwe (2015)

⁴⁰ These are not dissimilar from the figures estimated by Allianz in Figure 2, with the difference that the Bruegel figures allow a further breakdown by periods.

and the percentage that these purchases would represent at the end of each period (December 2015 and September 2016, respectively). The ECB's total assets are estimated for December 2015 and September 2016 based on the figures for the total ECB's purchases in Table 6. In other words, given the figures for the Central Bank total assets for the euro area in February 2015 (about EUR 2156 billion), the assumed euro area purchases are accounted on the ECB's balance sheet for a period of 10 months, consistent with Claeys, Leandro and Mandra (2015), for the period March – December 2015, and for a period of 9 months for the period January – September 2016.⁴¹ As it can be gauged from column 5 and 8, those purchases (end of period) remain not sizeable (2.76% for Italy; 1.97% for Spain and so on). Our take is that, under the current arrangement, the ECB's direct purchases under the EAPP do not entail specific or higher risks to the Central Bank's balance sheet, or anyway risks which are qualitatively different from the one involved in standard monetary policy operations or previously implemented asset purchase programs (e. g, SMP, CBPP).

Table 6: Sovereign bond purchases by country and by bondholder
(March 2015 to September 2016)

			March - December 2015			January - September 2016		
	ECB capital key (%)	Maximum monthly purchases €billions	ECB monthly purchases €billions	NCB monthly purchases €billions	ECB purchases % of total assets (end of period, i.e. 10 months)	ECB monthly purchases €billions	NCB monthly purchases €billions	ECB purchases % of total assets (end of period, i.e. 9 months)
Germany	25.6	11.2	10.2	102.3	4.02	9.2	92	2.91
France	20.1	8.9	8.1	80.6	3.19	7.3	72.5	2.31
Italy	17.5	7.7	7	70	2.76	6.3	63	1.99
Spain	12.6	5.5	5	50.2	1.97	4.5	45.2	1.42
Netherlands	5.7	2.5	2.3	22.7	0.91	2	20.5	0.63
Belgium	3.5	1.5	1.4	14.1	0.55	1.3	12.7	0.41
Greece	2.9	1.3	0.1	0.7	0.04	0	0.4	0.00
Austria	2.8	1.2	1.1	11.2	0.43	1	10	0.32
Portugal	2.5	1.1	1	9.9	0.39	0.9	8.9	0.28
Finland	1.8	0.8	0.7	7.1	0.28	0.6	6.4	0.19
Ireland	1.6	0.7	0.7	6.6	0.28	0.6	5.9	0.19
Slovakia	1.1	0.5	0.4	4.4	0.16	0.4	4	0.13
Lithuania	0.6	0.3	0	0	0.00	0	0	0.00
Slovenia	0.5	0.2	0.2	2	0.08	0.2	1.3	0.06
Latvia	0.4	0.2	0.1	0.7	0.04	0.1	0.5	0.03
Luxembourg	0.3	0.1	0	0	0.00	0	0	0.00
Estonia	0.3	0.1	0	0	0.00	0	0	0.00
Cyprus	0.2	0.1	0.1	0.5	0.04	0	0.2	0.00
Malta	0.1	0	0	0.4	0.00	0	0.3	0.00
TOTAL	100	44	38.3	383.2	15.09	34.5	343.8	10.90

Source: Claeys, Leandro and Mandra (2015) and authors' calculations ("ECB purchases % of total assets" column).

At the same time, it is worth stressing that the limited European guarantee and course of actions may make market believe that "QE is not enough" as the decoupling of Greek bonds has recently shown. To be credible the European EAPP needs more mutualisation. This can be done only if tail risks of default are reduced, hence avoiding a scenario where the Central Bank will operate with negative equity. By removing market pressure, QE would certainly give countries a window of opportunity to do the necessary investment and reforms to spur and rebalance growth. This is the only way European QE can prove effective.

⁴¹ The ECB's total assets for December 2015, for instance, are estimated as the February 2015 figure (EUR 2156 billions) plus the Bruegel's estimated total ECB's monthly purchases (EUR 38.3 billion a month), for a period of 10 months, i.e. 2156 billions + monthly 38.3 billion X 10 months = EUR 2539 billion in December 2015. For September 2016 we cumulate the latter figure, with the monthly ECB's total asset purchases, as provided by the Bruegel report, over the January – December period.

4. POLICY MEASURES TO MITIGATE SOME OF THE RISKS

While we have pointed out potential risks from the QE program, the question remains on how ECB can tackle these problems in the current context. We have identified a few measures that would at least help alleviate the potential scarcity of bonds or liquidity problem.⁴²

- Cutting the deposit rate further or abandoning the negative-yield rule in order to make more bonds eligible for purchase. ECB President Mario Draghi has already signalled he would consider buying negative-yielding debt. In practice, however, there is a risk that the policy of cutting the deposit rate further, while unfreezing additional eligible bonds, might harm the money markets, and add to the existing uncertainty on lending. In fact, pushing the deposit rate lower than -0.2 would imply banks will make more clients pay (rather than earn) an interest rate to hold their money, with the obvious side effect of retail clients preferring to hold cash instead. In addition, should banks (and not clients) shoulder the costs of negative rates themselves, this will squeeze the profit margin between their lending and deposit rates, and making them less willing to lend.
- ECB could loosen the self-imposed restriction not to own more than 25% of any single bond, thereby increasing its portfolio composition. By removing this limit, possible OMTs and EAPP interactions would be avoided. In fact, contrary to its initial design, the OMT programme could no longer be seen as “unlimited”, especially from the point of view of some peripheral euro area countries, where the 25 per cent (and 33 per cent) limits would leave barely any room for possible OMT purchases in addition to the planned QE purchases. The agreed limit would thus make QE purchases interact with previous acquisitions of bonds by the ECB or the NCBs, limiting the pace of purchases overall. One of the main constraints in removing the 25% limit is political. Removing the 25% limit, while practically effective, could increase Germany’s nervousness about the Eurozone status quo, especially in the light of the European Court of Justice final ruling on the ECB’s OMT case, referred by German Constitutional Court this 16 June 2015.
- It could also consider increasing purchase of bonds belonging to government agencies and/or expand the list of agencies eligible for QE, which would help it alleviate the supply-constraint on the national debt markets.
- EAPP needs more mutualisation or guarantees. As discussed in the previous sections, a quantitative easing program trading-off between efficacy and political feasibility is likely to be less effective, especially in a situation where the aforementioned implementation limits become biting. We recognize, however, that additional mutualisation creates political resistance and we argue this should be done only if tail risks of default are reduced, hence avoiding a scenario where the Central Bank will have to operate with negative equity. The latter, while not representing a problem per sé, may increase the nervousness of some euro area countries about the QE program. It is understood that QE does not address any structural issues underlying the fragility of some euro area economies. As such, we argue that the European QE should be understood as instrumental to boost confidence and not as a “new normal” (even if this does not rule out the possibility of multiple rounds of QE, as in the US or the UK). By removing market pressure, QE would give indeed countries a window of opportunity to do the necessary investment and reforms to spur and rebalance growth. ECB needs to improve communication with the markets in order to reduce market volatility. Confusion and doubts amongst market participants should be avoided at all costs. Increased market volatility is not only bad for investments and risk management policies, but also for the effectiveness of the EAPP program as a whole. Therefore, communication with the markets needs to be clear, honest, continuous and unanimous. In this respect, lessons and best-

⁴² We recognize that this is neither an exhaustive nor exclusive list of measures. Other instruments could possibly attain the same outcomes. It should simply be taken as a list of suggestions.

practices can be drawn from Fed's, BoE's and BoJ's QE communications (see also IMF, 2013).

- Coordination with national regulators and supervisors will be necessary in the coming months in order to secure a 'release' of some of the bonds from banks, insurers and pension funds. ECB should make sure that conservative (banking and insurance) rules, which in normal times make sense, are not proving a binding constraint on its policy measures, and do not heavily restrict the much-needed liquidity on the market.
- A possible set of exceptional incentive measures for financial intermediaries should be considered, which would incentivize them to remain on the European capital markets, release some of the bond supply, and engage in private lending. Examples of such measures could be to temporarily expand the list of eligible European assets for Tier I or II capital, to temporarily relax the liquidity requirements in order to allow intermediaries to go into more illiquid European alternatives and release some of their (more liquid) bonds, or to provide a State guarantee for investments into national corporate/private bonds. These measures, should however, have a temporary feature in order not to encourage pro-cyclical and herding behaviour.
- Macro-prudential policy, as we described in an earlier note, are crucial in order to maintain excessive risks from building up, and from avoiding a (possible) systemic crisis. ECB and/or NCB should not be afraid of triggering these policies if indicators show that speculation is overtaking the markets.⁴³

5. CONCLUSIONS

As announced by ECB President Mario Draghi at the press conference of 22 January 2015, in March the Euro-system started the Expanded Asset Purchase Programme (EAPP), i.e. the purchase (on the secondary market) of euro-denominated bonds issued by governments, agencies and European institutions. The program foresees a key role of national central banks (NCBs) of the Eurozone in the purchase of sovereign bonds. This will be part of the European Central Bank's 1.14 EUR trillion landmark quantitative easing (QE) programme (or about EUR 60 billion/month) to be carried out until September 2016. Given its size and open-ended nature, QE has been at the centre of policy discussions, in particular regarding the issues of risk sharing and possible market distortions.

On the first point, we argue that risk sharing on QE purchases would not constitute a risk to the ECB's balance sheet, which is qualitatively different from the risk involved in standard monetary policy operations or previously implemented asset purchase programs (e. g, SMP, CBPP). Moreover, direct ECB's purchases (i.e. 8% of the so-called "additional purchases") are admittedly limited, given the current arrangements. A limited European guarantee and course of actions may make markets believe that "QE is not enough" as the decoupling of Greek bonds has recently shown. To be credible the EAPP needs more mutualisation. We recognize however this is not without problems, given the nervousness of some countries about the status quo of the euro area.

On the second point, the currently low (or negative) yields for many segments of Eurosystem sovereign bonds coupled with possible shortages of available bonds to purchase poses challenges to the success of the programme. However, based on the current projections, the restrictions inherent in the program should not be binding, and therefore the scarcity in the supply of bonds should not be an issue in our view. Nonetheless, as evolving economic conditions may drastically affect the bond market we argue that a careful monitoring of market developments as well as flexibility in the implementation of policy measures are crucial elements for the success of QE going ahead.

⁴³ ["Financial \(in\)stability low interest rates and \(un\)conventional monetary policy"](#), Monetary Policy Dialogue, note to the European Parliament, IP/A/ECON/2015-01, Mar 2015.

REFERENCES

- Atkins R. (2015), German bond measure success of Eurozone QE, Financial Times, https://www.google.co.uk/?gws_rd=ssl#q=German+bond+measure+success+of+Eurozone+QE
- Barley R. (2015), Corporate Bonds Left Behind by ECB QE Rush, The Wall Street Journal, <http://www.wsj.com/articles/corporate-bonds-left-behind-by-ecb-qe-rush-heard-on-the-street-1427390765>
- Bindseil U., Manzanares A. and Weller B. (2004), The role of central bank capital revisited, ECB Working Paper, no. 392 <https://www.ecb.europa.eu/pub/pdf/scpwps/ecbwp392.pdf>
- Black J. and Bosley C. (2015), Draghi Seen Dispelling Duration Doubts About QE Program, Bloomberg Business <http://www.bloomberg.com/news/articles/2015-04-14/draghi-seen-dispelling-qe-duration-doubts-as-ecb-jolts-economy>
- BNP Paribas (2015), ECB QE: The thin line between scarcity and shortage, [rss-globalmarkets.bnpparibas.com/r?t=AjuGAjioPVFIWj5PRtNM](http://globalmarkets.bnpparibas.com/r?t=AjuGAjioPVFIWj5PRtNM)
- Bosomworth A. (2015), The International Ramifications of ECB QE, Pimco, <http://www.pimco.co.uk/EN/Insights/Pages/The-International-Ramifications-of-ECB-QE.aspx>
- Brown Z.E. (2015), ECB: Get Ready for Shockwaves from QE, <https://www.lordabbett.com/en/perspectives/fixedincomeinsights/ecb-get-ready-for-shockwaves-from-qe.html>
- Callan O. (2015), German Yields Fall to Records as Moody's Warns on Bond Scarcity, Bloomberg News, <http://www.bloomberg.com/news/articles/2015-04-14/german-10-year-yields-approach-zero-with-ecb-set-for-qe-update>
- Chen Q., Filardo A., He D., and Zhu F. (2012), International Spillovers of Central Bank Balance Sheet Policies, BIS Paper No. 66p. Available at SSRN
- Claey's G., Á. Leandro and Mandra A. (2015), European Central Bank Quantitative Easing: the detailed manual, Bruegel Policy Contribution, Issue 2015/02.
- De Grauwe P. (2015), The sad consequences of the fear of QE, The Economist <http://www.economist.com/blogs/freeexchange/2015/01/quantitative-easing-and-euro-zone>
- ECB (2015) Q&A on the public sector purchase programme (PSPP), 5 March, <http://www.ecb.europa.eu/mopo/liq/html/pspp-qa.en.html>
- Fratzscher M., Lo Duca M., and Straub R. (2013), On the International Spillovers of US Quantitative Easing, ECB Working Paper Series No. 1557, June 2013.
- IMF Report on Unconventional Monetary Policies – Recent Experience and Prospects (2013) www.imf.org/external/np/pp/eng/2013/041813a.pdf Published in 18-04-2013
- Jones C., Hunter M. and Moore E. (2015), European Central Bank steps up pace of bond buying, Financial Times, <http://www.ft.com/intl/cms/s/0/1d6ec5dc-fdfc-11e4-8efb-00144feabdc0.html#axzz3baKkaPZW>
- Joyce, Michael, David Miles, Andrew Scott and Dimitri Vayanos (2012), "Quantitative Easing and Unconventional Monetary Policy – An introduction", The Economic Journal, 122(564), F271-F288; http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2168581
- JP Morgan (2105), Flows & Liquidity - Shortage vs. scarcity of collateral, www.jpmorganmarkets.com
- Larock D. (2015), Who is buying Government Bonds at These Microscopic Yield Levels? Monday Morning Interest Rate Update,

<http://www.integratedmortgageplanners.com/blog/monday-morning-rate-update/who-is-buying-government-bonds-at-these-microscopic-yield-levels-monday-morning-interest-rate-update-march-2-2015/>

- Nikko Asset Management (2015), Arguments against ECB QE Implementation Skeptics, <http://en.nikkoam.com/articles/2015/04/arguments-against-ecb-qe-implementation-skeptics>
- Noonan M. (2015) (2015), Q&A: ECB bond buying and national losses, Financial Times, www.ft.com/cms/s/0/0700fd98-9ff5-11e4-aa89-00144feab7de.html#axzz3b3yRralf
- Petersen A-K. (2015), QE Monitor – “This Ain’t No One-way Street”, Allianz Global Investors, <https://www.allianzglobalinvestors.de/.../QE-Monitor-April-2015.pdf?>
- Sarlo L. (2015), Bond Market Review and Outlook – Q1 2015, [http://www.loomissayles.com/internet/internetdata.nsf/0/2C40881911F408ED85257E21006BA15E/\\$FILE/First-Quarter-Bond-Market-Review-and-Outlook.pdf](http://www.loomissayles.com/internet/internetdata.nsf/0/2C40881911F408ED85257E21006BA15E/$FILE/First-Quarter-Bond-Market-Review-and-Outlook.pdf)
- Shea R. (2015), Long-dated Bond yields Lead Global Market Slide, Black Swan Economics, <http://www.blackswaneconomics.com/in-the-news/long-dated-bond-yields-lead-global-market-slide-881.html>
- SPY Ghana (2015), Abu Dhabi’s Bond Market Sets to Grow with Influx of QE Funds, <http://www.spyghana.com/abu-dhabis-bond-market-sets-grow-influx-qe-funds/>
- Stella P. (1997), Do Central Banks need Capital?, IMF Working Paper, WP/97/83. <http://www.imf.org/external/pubs/ft/wp/wp9783.pdf>
- Stubbington T. and Whittall C. (2015), European Bonds Back to Pre-QE Levels After Weeklong Selloff, The Wall Street Journal, <http://www.wsj.com/articles/european-bonds-back-to-pre-qe-levels-after-weeklong-selloff-1431010733>
- The Peninsular Qatar (2015), ECB’s QE can have large cross-border spillover effects, <http://thepeninsulaqatar.com/business/qatar-business/319559/ecb-s-qe-can-have-large-cross-border-spillover-effects-qnb>
- Whittall C. (2015), ECB Faces Struggle in Sourcing Enough Bonds for QE, The Wall Street Journal, <http://www.wsj.com/articles/ecb-faces-struggle-in-sourcing-enough-bonds-for-qe-1424868462>
- Zajac M. (2015), Bye-Bye Qe Effect: German Bund Yields Spike Amid Epic Bond Rout, <http://wbponline.com/Articles/View/47230/bye-bye-qe-effect-german-bund-yields-spike-amid-epic-bond-rout>